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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SWERDLOW, DANIEL	

ART UNIT	PAPER NUMBER
2644	24

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/819,158	NORRELL ET AL.	
	Examiner	**Art Unit**	
	Daniel Swerdlow	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,11-24 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-23 and 26* is/are allowed.

6)☒ Claim(s) *1-5,11,13-17 and 24* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. 24.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 June 2004 has been entered.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2, 3, 5, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quarles (US Patent 1,711,653) in view of Federal Telephone and Radio Corporation (FTRC) (Reference Data for Radio Engineers).

3. Claim 1 claims a load coil comprising a coupled inductor with two windings having an interwinding capacitance value between them wrapped about an inductor core with a first capacitive element between the input of the first winding and the output of the second winding and a second capacitive element between the input of the second winding and the output of the first winding. Quarles discloses a load coil comprising a coupled inductor with two windings that inherently have an interwinding capacitance value between them wrapped about an inductor core with capacitors connected diagonally across the windings (i.e., between the input of the first winding and the output of the second winding; and between the input of the second winding and

the output of the first winding) (Fig. 1 and page 1, lines 99-102). Claim 1 further claims each have capacitance values at least four times the inter-winding capacitance value. Quarles specifies the value of the capacitors as being half of the value to be used between the middle points of the loading coils (page 4, lines 58-64) which is specified to be between .4 and .8 of the total between the wires of one section of the loop. Quarles therefore teaches a value of the capacitors between .2 and .4 of the capacitance of a loop section. Federal Telephone and Radio Corporation teaches that the capacitance of a mile of 24 AWG telephone transmission line is .075 μF (page 111). A standard 6,000 foot loop section, therefore, has a capacitance of .075(6000/5280) μF which is equal to .085 μF or 85 nF. Hence, the values Quarles teaches are between .2(85)nF and .4(85) nF, that is, between 17 nF and 34 nF. It would have been obvious to one skilled in the art at the time of the invention to utilize the published values for transmission line capacitance of a standard loop section to calculate the capacitances taught by Quarles for the purpose of implementing Quarles's invention. The inter-winding capacitance of a load coil is 1,150 pF (see US Patent 6,546,100 to Drew, column 2, lines 32-33), which equals 1.15 nF. As such, the load coil made obvious by the combination of Quarles and FTRC has capacitance values that are at least 14.8 times the inter-winding capacitance value. Therefore, the combination makes obvious all elements of Claim 1. Claim 1 contains language indicating the inductor is configured to counteract capacitance across the loop to improve transmission of POTS-based signals and that the capacitive elements are configured to permit passage of DSL signals. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte

Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Because the load coil made obvious by the combination of Quarles and FTRC is structurally identical to the load coil of Claim 1, the recitation related to use carries no weight. Further, as shown above, Quarles makes obvious capacitive elements having a capacitance of 17 nF to 34 nF. Applicant's disclosure admits that capacitances of those values disposed as taught by Quarles will "permit passage of DSL signals across the load coil" (page 10, lines 18-25). In addition, Quarles the load coil increasing the possible range of the telephonic transmission of speech (i.e., improving the transmission of POTS-based signals) (page 1, lines 10-12).

4. Claim 2 claims the load coil of Claim 1 wherein the capacitive elements have a capacitance in the range of 10 nF to 82 nF. As stated above apropos of Claim 1, the combination of Quarles and FTRC makes obvious all elements of that claim. In addition, as stated above apropos of Claim 1, the combination makes obvious capacitive elements having a capacitance of 17 nF to 34 nF. Therefore, the combination makes obvious all elements of Claim 2.

5. Claim 3 claims the load coil of Claim 1 wherein the capacitive elements have a capacitance in the range of 5 nF to 50 nF. As stated above apropos of Claim 1, the combination of Quarles and FTRC makes obvious all elements of that claim. In addition, as stated above apropos of Claim 1, the combination makes obvious capacitive elements having a capacitance of 17 nF to 34 nF. Therefore, the combination makes obvious all elements of Claim 3.

6. Claim 5 claims the load coil of Claim 1 wherein the capacitive elements increase the effective interwinding capacitance of the inductor windings by at least a factor of 5. As stated above apropos of Claim 1, the combination of Quarles and FTRC makes obvious all elements of that claim. In addition, as stated above apropos of Claim 1, the combination of Quarles and

Federal Telephone and Radio Corporation makes obvious capacitance values between 17 nF and 34 nF. As shown above apropos of Claim 1, the interwinding capacitance of a load coil is 1.15 nF. As such, capacitance values between 17 nF and 34 nF increase the effective interwinding capacitance by a factor of 17/1.15 to 34/1.15 or 14.8 to 29.6. Applicant discloses that capacitances in the range of 5 nF to 50 nF increase the effective interwinding capacitance by a factor of five to ten (page 13, lines 15-18). Therefore, it is inherent in the values taught by Quarles and FTRC that they increase the effective interwinding capacitance of the inductor windings by at least a factor of 5.

7. Claim 16 is essentially similar to Claim 1 and is rejected on the same grounds.

8. Claim 24 claims the load coil of Claim 1 wherein the capacitive elements have a capacitance value at least five times the interwinding capacitance value. As stated above apropos of Claim 1, the combination of Quarles and FTRC makes obvious all elements of that claim. In addition, as stated above apropos of Claim 1, the load coil made obvious by the combination of Quarles and FTRC has capacitance values that are at least 14.8 times the inter-winding capacitance value. Therefore, the combination makes obvious all elements of Claim 24.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Quarles in view of FTRC and further in view of Pinel (US Patent 3,848,098). Claim 4 claims the load coil of Claim 1 wherein the coupled inductor has an inductance of about 66 mH. As stated above apropos of Claim 1, Quarles discloses all relevant elements of that claim. Therefore, Quarles discloses all relevant elements of Claim 4 with the exception of specification of the inductance value. Pinel discloses that 66 mH is a typical value for inductors used as loading coils on analog telephone

lines (column 3, lines 11-14). It would have been obvious to one skilled in the art at the time of the invention to use a load coil with a typical inductance value in the system disclosed by Quarles for the purpose of having a loading coil easily obtainable in forms suitable for use in outside plant telephone installations.

10. Claims 11, 13 through 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drew in view of Shenoi.

11. Claim 11 claims a system for transmitting DSL and POTS signals. Drew discloses a load coil for use in a system that transmits DSL and POTS signals (column 3, lines 17-21). Claim 11 further claims a load coil for disposal along a local loop. Drew discloses a load coil for a two-conductor transmission line that corresponds to the local loop claimed (column 1, lines 31-37). Claim 11 further claims the load coil includes a coupled inductor. Drew discloses a coupled inductor (Fig. 4, reference 42, 44; column 2, line 62 through column 3, line 2). Claim 11 further claims the load coil includes multiple capacitive elements. Drew discloses capacitors (Fig. 4, reference 46, 48; column 3, lines 2-3) connected in parallel across the first winding and the second winding. Claim 11 further claims the capacitive elements have capacitance values relative to an interwinding capacitance value of the coupled inductor to improve transmission of DSL signals across the load coil. Drew discloses the capacitors that correspond to the capacitive elements claimed having capacitance values of 50 nF to 100 nF (column 3, lines 12-15) and an interwinding capacitance (Fig. 4, reference C'ic; column 2, lines 30-33) value of 1150 (1.15 nF). Further, Drew discloses that these capacitance values allow the capacitors to provide a low impedance path for high frequency signals to bypass the windings (i.e., permit passage of DSL

signals across the load coil) (column 3, lines 18-20). Therefore, Drew anticipates all elements of Claim 11 with the exception of a DSL signal repeater for disposal along the local loop to amplify the DSL signals, the repeater including a load coil for conditioning POTS signals. Shenoi discloses a DSL repeater (Fig. 4, reference 400; column 7, lines 54-55) that includes load coils (column 7, lines 59-63). It would have been obvious to one skilled in the art at the time of the invention to combine the repeater taught by Shenoi with the load coil taught by Drew for the purpose of providing DSL over long loaded loops.

12. Claim 13 claims the system of Claim 11 with first and second windings and capacitive elements disposed in parallel with those windings. As stated above apropos of Claim 11, the combination of Drew and Shenoi makes obvious all elements of that claim. In addition, as stated above apropos of Claim 11, Drew discloses capacitive elements disposed in parallel with the windings. Therefore the combination makes obvious all elements of Claim 13.

13. Claim 14 claims the system of Claim 11 wherein the capacitive elements have a capacitance value in the range of 10 nF to 82 nF. As stated above apropos of Claim 11, the combination of Drew and Shenoi makes obvious all elements of that claim. In addition, as stated above apropos of Claim 11, Drew discloses capacitive elements having a capacitance of 50 nF to 100 nF. Therefore, the combination makes obvious all elements of Claim 14.

14. Claim 15 claims the load coil of Claim 11 wherein the capacitive elements have a capacitance in the range of 5 nF to 50 nF. As stated above apropos of Claim 11, the combination of Drew and Shenoi makes obvious all elements of that claim. In addition, as stated above apropos of Claim 11, Drew discloses capacitive elements having a capacitance of 50 nF to 100 nF. Therefore, the combination makes obvious all elements of Claim 15.

15. All elements of Claim 17 are comprehended by Claim 11. Claim 17 is rejected for the reasons stated above apropos of Claim 11.

Allowable Subject Matter

16. Claims 18 through 23 and 26 are allowed.

17. The following is an examiner's statement of reasons for allowance:

18. Claim 18 claims a method for improving simultaneous transmission of POTS and DSL along a local loop. Drew discloses a load coil for a two-conductor transmission line that corresponds to the local loop claimed (column 1, lines 31-37) and provides flat frequency response in the VF (i.e., POTS) band and decreased attenuation in the high frequency (i.e., DSL) band (column 1, lines 41-45). Claim 18 further claims inductively coupling a first loop segment and a second loop segment via a coupled inductor to condition POTS signals. Drew discloses a coupled inductor (Fig. 4, reference 42, 44; column 2, line 62 through column 3, line 2) between a first loop segment (Fig. 1, between references 22a and 22b) and a second loop segment (Fig. 1, reference 12). Claim 18 further claims capacitvely coupling the loop segments via capacitive elements to pass DSL signals with low attenuation. Drew discloses capacitors (Fig. 4, reference 46, 48; column 3, lines 2-3) connected in parallel across the first winding and the second winding to provide a low impedance (i.e., low attenuation) path for high frequency signals (column 3, lines 17-20). Claim 18 further claims the capacitive elements have capacitance values selected based a capacitance value of the coupled inductor. Drew discloses the capacitors that correspond to the capacitive elements claimed having capacitance values of 50 nF to 100 nF (column 3, lines 12-15) and a parasitic winding capacitance (Fig. 4, reference C'w; column 3, lines 5-12) that

corresponds to the intra-winding capacitance claimed having a value of 288 pF (0.288 nF) (column 2, lines 26-28). However, Drew is silent as to the manner in which these values are selected. Drew further discloses an additional DSL-compatible load coil between the first loop segment and a third loop segment (Fig. 1, reference 22b). Therefore, Drew anticipates all elements of Claim 18 with the exception of capacitance values selected based a capacitance value of the coupled inductor and amplifying the DSL signals between the first loop segment and a third loop segment after the coupled inductor and capacitive elements. Shenoi discloses a DSL repeater (Fig. 4, reference 400; column 7, lines 54-55) that includes load coils (column 7, lines 59-63). It would have been obvious to one skilled in the art at the time of the invention to utilize the repeater taught by Shenoi in place of the second load coil in the loop taught by Drew for the purpose of providing amplification of DSL signals. Therefore, the combination of Drew and Shenoi makes obvious all elements of Claim 18 except the capacitive elements having capacitance values selected based a capacitance value of the coupled inductor. Since the prior art neither anticipates nor makes obvious the capacitance values selected based a capacitance value of the coupled inductor Claim 18 is allowable.

19. Claims 19 through 21 are allowable due to dependence from Claim 18.

20. Claim 22 claims a system to improve simultaneous transmission of POTS and DSL signals across a local loop by traversing a coupled inductor (i.e., a load coil) with capacitors diagonally disposed across the load coil as in applicant's Fig. 3. As shown above, apropos of Claim 1, the prior art makes obvious such a load coil. However, the prior art fails to anticipate of make obvious a system to improve simultaneous transmission of POTS and DSL signals across a local loop using such a load coil. While the prior art load coil is structurally identical to the load

coil of Claim 1 and would, therefore, improve simultaneous transmission of POTS and DSL signals across a local loop, there is no suggestion, teaching or motivation to employ it in a system to do that. As such, Claim 22 is allowable.

21. Claim 23 claims a system to improve simultaneous transmission of POTS and DSL signals across a local loop by traversing a coupled inductor (i.e., a load coil) with capacitors in parallel with the interwinding capacitance of the load coil. As depicted in Fig. 2 in Drew, interwinding capacitance (Cic) is modeled as two capacitors diagonally disposed across the load coil. As such, capacitors in parallel with the interwinding capacitance of the load coil are diagonally disposed as in applicant's Fig. 3. As shown above, apropos of Claim 1, the prior art makes obvious such a load coil. However, the prior art fails to anticipate of make obvious a system to improve simultaneous transmission of POTS and DSL signals across a local loop using such a load coil. While the prior art load coil is structurally identical to the load coil of Claim 1 and would, therefore, improve simultaneous transmission of POTS and DSL signals across a local loop, there is no suggestion, teaching or motivation to employ it in a system to do that. As such, Claim 23 is allowable.

22. Claim 26 claims a method of passing signals across a load coil with a capacitive element in parallel with an interwinding capacitance. As depicted in Fig. 2 in Drew, interwinding capacitance (Cic) is modeled as two capacitors diagonally disposed across the load coil. As such, capacitors in parallel with the interwinding capacitance of the load coil are diagonally disposed as in applicant's Fig. 3. As shown above, apropos of Claim 1, the prior art makes obvious such a load coil. However, the prior art fails to anticipate or make obvious a method of using such a load coil to pass the diverse signals as claimed. As such, Claim 26 is allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

23. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. Claim 12 claims the system of Claim 11 wherein the coupled inductor has first and seconds windings with capacitive elements disposed diagonally across those windings. As stated above apropos of Claim 11, the combination of Drew and Shenoi makes obvious all elements of that claim. In addition, Quarles discloses diagonal disposal of capacitors in a loading coil. As shown above, apropos of Claim 1, the prior art makes obvious such a load coil. However, the prior art fails to anticipate or make obvious a method of using such a load coil to pass the diverse signals as claimed. As such, Claim 12 is allowable matter.

Response to Arguments

25. Applicant's arguments filed 13 June 2004 have been fully considered but they are not persuasive.

26. In arguments spanning pages 13 through 17 and 18 through 19 of the response filed on 13 June 2004, applicant argues that the lack of use of the load coil taught by Quarles on DSL lines proves that examiner's analysis of the capacitance values of the load coil taught by Quarles is

incorrect. Examiner disagrees. As examiner has shown in prior Office actions, the load coil claimed by applicant in Claims 1 through 5, 16 and 24 is made obvious by Quarles. However, applicant's arguments are based on the false assumption that "The 1929 load coil disclosed in Quarles would certainly have been available at the time Drew was filed in 1998". That Drew and other references cited teach the difficulty of transmitting DSL signals over load coils does not imply that the load coil made obvious by Quarles would not pass DSL signals. Clearly, the Quarles load coil was simply never deployed in the telephone system or was deployed so sparsely or briefly as to have no effect on DSL deployment. As such, while the use of the load coil to pass DSL signals may be patentable, the coil itself is not.

27. On pages 17 through 18, applicant argues against examiner's use of Drew for load coil interwinding capacitance value. As stated in a prior Office action, Drew characterizes this value as "typical". Given this characterization and the wide margin by which the load coil made obvious by Quarles meets the claim limitations, examiner has met the burden of a prima facie case of obviousness. Similarly, examiner's use of standard reference for capacitance values of a line and load coil spacing meet this burden. As such, the presumption is not overcome by applicant's assertions.

28. Spanning pages 19 and 20, applicant argues that the disclosures of five references, the oldest of which is dated 29 November 1996 are evidence of a long-felt need in the art that applicant alleges obviates the finding of obviousness. Examiner disagrees. Establishing long-felt need requires objective evidence that an art recognized problem existed in the art for a long period of time without solution. The references cited indicate that the problem of load coils blocking DSL transmissions had been solved in a variety of ways including by load coil

switching and other capacitive bypass configurations. Further, there is no evidence that if persons skilled in the art who were presumably working on the problem knew of the teachings of Quarles, they would still be unable to solve the problem.

29. Spanning pages 20 and 21, applicant reasserts arguments already responded to in the Advisory Action mailed on 12 April 2004 and reiterates the incorrect assumption that examiner has not considered the limitation in Claim 1: "wherein the first capacitive element and second capacitive element each have capacitance values that are at least four times the inter-winding capacitance value between the first winding and the winding to permit passage of DSL signals across the load coil". As shown in the rejection above and in prior Office actions, examiner has considered this limitation and shown that Quarles makes obvious "the first capacitive element and second capacitive element each have capacitance values that are at least four times the inter-winding capacitance value between the first winding and the winding". Examiner has also shown apropos of Claim 2 that Quarles makes obvious capacitive elements having a capacitance of 17 nF to 34 nF. Applicant's disclosure admits that capacitances of those values disposed as taught by Quarles will "permit passage of DSL signals across the load coil" (page 10, lines 18-25).

30. Spanning pages 21 through 23 applicant argues that the interwinding capacitance of the load coil of Quarles is essentially unknowable and so cannot be used to show obviousness of Claim 1. Examiner disagrees. In the absence of definitive information regarding the interwinding capacitance in the disclosure of Quarles, the use of a value disclosed as "typical" in Drew which agrees closely with applicant's admission of load coil interwinding capacitance meets the burden for making the prima facie case of obviousness.

31. Applicant's arguments regarding Claims 2 through 5 and 24 are limited to their dependence from Claim 1. As such the arguments are unpersuasive for the reasons stated above.

32. Applicant's arguments regarding Claim 22 are moot in view of the allowance of that claim, above.

33. Applicant's arguments regarding Claims 11 through 15 are limited to rejections made in view of Quarles. These rejections are withdrawn and Claim 12 is indicated as allowable matter above. Claims 11 and 13 through 15 remain rejected as obvious over Drew in view of Shenoi as shown above.

34. On pages 26 through 56 of the response, applicant repeats arguments made in the earlier response filed on 23 April 2004 to which examiner has responded in the Advisory Action mailed on 12 May 2004.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 703-305-4088. The examiner can normally be reached on Monday through Friday between 8:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forrester Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ds

XU MEI
PRIMARY EXAMINER